Microfluidic Cytometer for Complete Blood Count Analysis, Phase II

Completed Technology Project (2006 - 2008)

Project Introduction

We will fabricate and test microfluidic designs for a micro-electromechanical system based complete blood count (CBC) analysis in separate modules and integrate them into a working prototype. A first module constitutes a hydrodynamic focusing injector and cell impedance meter. A second module takes hydrodynamically focused cells and measures light scatter in the forward and orthogonal directions, as well as of fluorescence emission intensities from specific cell types using novel signal collection designs and micrometer scale, and Geiger-mode avalanche photodiodes that produce time-correlated photocount statistics from multiple optical sources. The third module will serve for blood sample dilution, routing, automated lysing and removal of human erythrocytes. This unit will also incorporate a sensor for measuring hemoglobin (Hgb) concentration. The proposed blood analyzer will utilize innovative optical and fluidic designs on a modular platform that enable compactness, high sensitivity, and robust service, while requiring no operator intervention.

Primary U.S. Work Locations and Key Partners

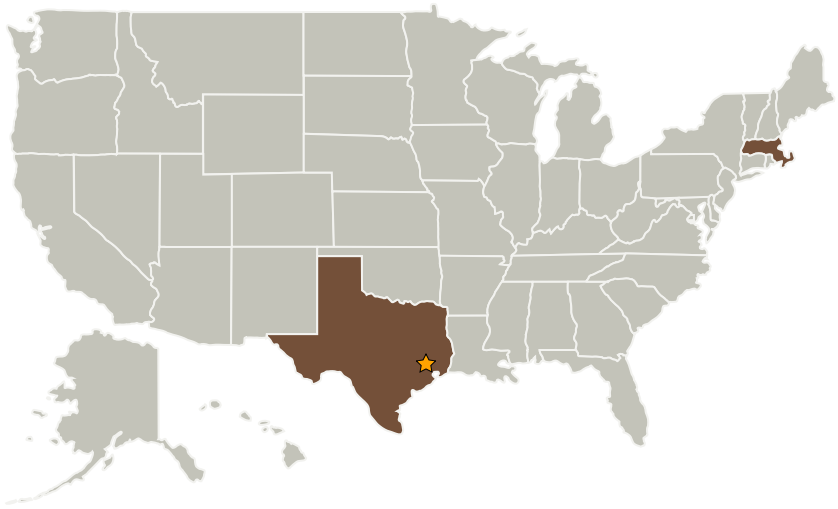

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Table of Contents

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Johnson Space Center (JSC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas
Radiation Monitoring Devices, Inc.	Supporting Organization	Industry	Watertown, Massachusetts

Primary U.S. Work Locations	
Massachusetts	Texas

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.2 Electronics